

“Soft” Ablation Cell for LA-ICP-MS Investigations of Large Precious Samples

HAIHONG CHEN¹, YONGSHENG LIU^{1*}, MING LI¹,
ZHAOCHU HU¹, WEN ZHANG¹, AND TAO LUO

¹ State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences, Wuhan 430074, China (haihongchen@sina.cn)

Abstract

A novel “soft” ablation cell for laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) has been developed. The cell includes a sample holder with a gas inlet, a local aerosol extraction device fixed and connected to the outer transfer tube, and a large soft amorphous outer chamber, which is not limited to samples of particular size or shape and is insensitive to sample surface. Compared to commonly applied standard ablation cell, the sensitivity was increased by a factor of 3.8–18.0 and 1.1–1.3 for single-pulse and continuous ablation respectively, the washout time was 94% faster and provides washout times within approx.1s for 99.9% of the signal. The signal intensities obtained in six different three-dimensional positions in the cell remained almost unchanged, and the RSD was less than 3.21%. The evaluation of the ablation cell demonstrates high resolution capabilities on large solid samples. It promises to provide direct, in-situ, and non-destructive analysis of large precious samples in micro-area geochemistry, archaeology, gem Identification, forensic science, and conservation science.

Key words: trace element, ablation cell, large precious samples, LA-ICP-MS